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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/912,262	07/24/2001	Roger L. Schultz	2000-IP-000069	4140

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EXAMINER	
WAKS, JOSEPH	

ART UNIT	PAPER NUMBER
2834	

DATE MAILED: 02/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/912,262	SCHULTZ ET AL.
	Examiner	Art Unit
	Joseph Waks	2834

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 December 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7,9-15 and 18-123* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *14,15,18 and 23-49* is/are allowed.

6)☒ Claim(s) *See Continuation Sheet* is/are rejected.

7)☒ Claim(s) *3-7,57,59-61,63,65-67,76-79,100,102,103,106-108,111,115,117,118,122 and 123* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 July 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Continuation of Disposition of Claims: Claims rejected are 1,2,6,9-13,19-22,50-56,58,62,64,68-75,80-82,86-99,101,104,105,109,110,112,113,116 and 119-121.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. **Claims 1, 2, 7, 74** and **75** are rejected under 35 U.S.C. 102(b) as being anticipated by **Kolm et al. (US 4,467,236)**.

Kolm et al. disclose in Figure 5 invention as claimed: an electric power generator comprising a fluid conduit (the air passages in the fence 50) configured for flow of fluid there through having an internal surface with outwardly extending projections 14 inducing turbulent flow in the conduit, and a piezoelectric material 34 attached to the external surface of the conduit and producing electricity in response to pressure fluctuations in the conduit caused by the fluid flow.

3. **Claims 6, 19, 62, 64, 68-70, 80-82, 86-99, 101, 104** and **105** are rejected under 35 U.S.C. 102(b) as being anticipated by **Russel et al. (US 3,970,877)**.

Russel et al. disclose invention as claimed: an electric power generator comprising a tubular fluid conduit connectable in a tubular string and a piezoelectric material 10 producing electricity in response to pressure fluctuations in the conduit caused by the fluid flow and attached to the external surface of the fluid conduit.

The feature of the reduced thickness portion is inherent to the Russel et al's disclosed structure.

Re claims 19, 62, 81, 82, 86, 94, 104 and 105, **Russel et al.** disclose the structure for producing the electric power as claimed. Claims 19, 62, 81, 82, 86, 94, and 105 that merely recite connecting and using the disclosed features together are inherent to the disclosed structure.

4. **Claims 50-56, 58, 109, 110, 112, 113, 116,** and **119-121** are rejected under 35 U.S.C. 102(b) as being anticipated by **Kunkel (US 5,554,922)**.

Kunkel discloses in Figure 1 invention as claimed: a fluid conduit configured to flow the fluid there through (Re column 4, lines 3-5), a fluid chamber 4vibrating in response to pressure fluctuations in the conduit, a piezoelectric material 6 attached to the chamber and producing electricity in response to the fluid chamber vibration.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. **Claims 9-11, 20-22, 71-73** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Russel et al. (US 3,970,877)** in view of **Klatt (US 4,669,068)**.

Russel et al. disclose the generator essentially as claimed. However, **Russel et al.** do not disclose the fluid conduit being helically shaped.

Klatt discloses in Figures 1 and 2 an electric power generator provided with a drill string and having a helically shaped fluid conduit 2 for the purpose of improving the generator adapted for low frequencies by absorbing the extra length required for the piezoelectric converter 10.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to design the generator as taught by **Russel et al.** or **Tubel et al.** and to provide the helically shaped fluid conduit as taught by **Klatt** for the purpose of improving the generator that is adapted for low frequencies by absorbing the extra length required for the piezoelectric converter using the helical configuration.

Re claims 20-22, **Russel et al.** disclose the structure for producing the electric power as claimed. Claims 20-22 that merely recite connecting and using the disclosed features together are inherent to the disclosed structure.

7. **Claims 12** and **13** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Russel et al. (US 3,970,877)** or **Kolm et al. (US 4,467,236)**.

Russel et al., Kolm et al. and **Tubel et al.,** all disclose the claimed invention except for the conduit made of titanium or of a composite material. It would have been obvious to one having ordinary skill in the art at the time the invention was made to design the generator with the conduit made of titanium or composite material for the purpose of meeting the particular working conditions like, temperatures, vibrations or corrosive environment, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Allowable Subject Matter

8. **Claims 3-5, 57, 59-61, 63, 65-67, 76-79, 83-85, 102, 103, 106, 111, 115, 117, 118, 122** and **123** are objected to as being dependent upon a rejected base claim, but would be allowable if

rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Re claims 3 and 4, the feature of the generally tubular fluid conduit configured for flow of fluid there through having an internal surface with outwardly extending projections inducing turbulent flow in the conduit, in combination with the other limitations present, are neither disclosed nor taught by the prior art of record.

Re claim 5, the feature of the fluid conduit including a reduced thickness portion with the piezoelectric material attached proximate to the reduced thickness portion, in combination with the other limitations present, are neither disclosed nor taught by the prior art of record.

Re claim 57, the feature of the piezoelectric material attached to the fluid conduit, in combination with the other limitations present, are neither disclosed nor taught by the prior art of record.

Re claims 59-61, the features of the helically shaped conduit, the internally formed recess included in the conduit and/or the helically extending recess, in combination with the other limitations present, are neither disclosed nor taught by the prior art of record.

Re claim 63, the feature of the piezoelectric material attached to the membrane, in combination with the other limitations present, are neither disclosed nor taught by the prior art of record.

Re claim 65, the feature of the piezoelectric material attached to the outer housing, in combination with the other limitations present, are neither disclosed nor taught by the prior art of record.

Re claim 66 and 67, the feature of the piezoelectric material attached to the piston bounding a portion of the fluid chamber, in combination with the other limitations present, are neither disclosed nor taught by the prior art of record.

Re claims 76-79, 83-85, 100, 102, 107 and 108, the feature of the piezoelectric material supporting the member extending into the flow passage, in combination with the other limitations present, are neither disclosed nor taught by the prior art of record.

Re claims 103, 106 the feature of the member contacting the retainer in response to fluid flow and the piezoelectric material producing electricity in response, in combination with the other limitations present, are neither disclosed nor taught by the prior art of record.

Re claims 111 and 117, the feature of the tubular membrane, in combination with the other limitations present, are neither disclosed nor taught by the prior art of record.

Re claims 115 the feature of the piezoelectric material outwardly surrounding the membrane, in combination with the other limitations present, are neither disclosed nor taught by the prior art of record.

Re claims 118 the step of flowing fluid through the membrane, in combination with the other limitations present, are neither disclosed nor taught by the prior art of record.

9. **Claims 14, 15, 18,** and **23-49** are allowed.

Re claims 14, 15 and 18, the method including steps of: of flowing fluid through the conduit connected to the string positioned in the well, producing electricity in piezoelectric material attached to the reduced thickness portion of the conduit in response to flexing of the reduced thickness portion by the flowing fluid wherein the reduced thickness portion have an

increased degree of flexing relative to the remainder of the conduit, in combination with the other limitations present, are neither disclosed nor taught by the prior art of record.

Re claims 23-36, the feature of the structure including a mass reciprocably disposed relatively to the housing and the bias member positioned between the mass and the piezoelectric material

Re claims 37-49, the method of producing power including steps of interconnecting the outer housing in the tubular string, positioning the tubular string in the subterranean well and flowing fluid though the housing thus, inducing the strain in the piezoelectric material via the bias member positioned between the mass and the piezoelectric, in combination with the other limitations present, are either disclosed or taught by the prior art of record.

Response to Arguments

10. Applicant's arguments filed December 16, 2002 have been fully considered but they are not persuasive.

Re claims 1 and 2, **Kolm et al.** disclose the structure as claimed. Examiner directs applicants' attention to Figure 5 showing air conduits (i.e. the air passages in the fence 50) having an internal surface with outwardly extending projections 14 inducing turbulent flow In the conduit.

Re claim 6, **Russel et al.** disclose the structure as claimed. Since Russel et al. clearly indicate in the drawing a continuity of flow through the conduit and than to outside the conduit the restriction created by the rib formation 11 will create turbulence outside the conduit as well as the pressure fluctuation inside the conduit. Therefore, inherently it will affect the

piezoelectric material located adjacent to the area of decreased wall thickness. The feature of the projections formed on the internal surface of the conduit is not recited in claim 6.

11. Applicant's arguments with respect to claim 50-56, 58 have been considered but are moot in view of the new ground(s) of rejection.

Communication

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Waks whose telephone number is (703) 308-1676. The examiner can normally be reached on Monday through Thursday 8 am to 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor R Ramirez can be reached on (703) 308-1371. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-1341 for regular communications and (703) 305-1341 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

JOSEPH WAKS
PRIMARY PATENT EXAMINER
TC-2800

JW
February 6, 2003